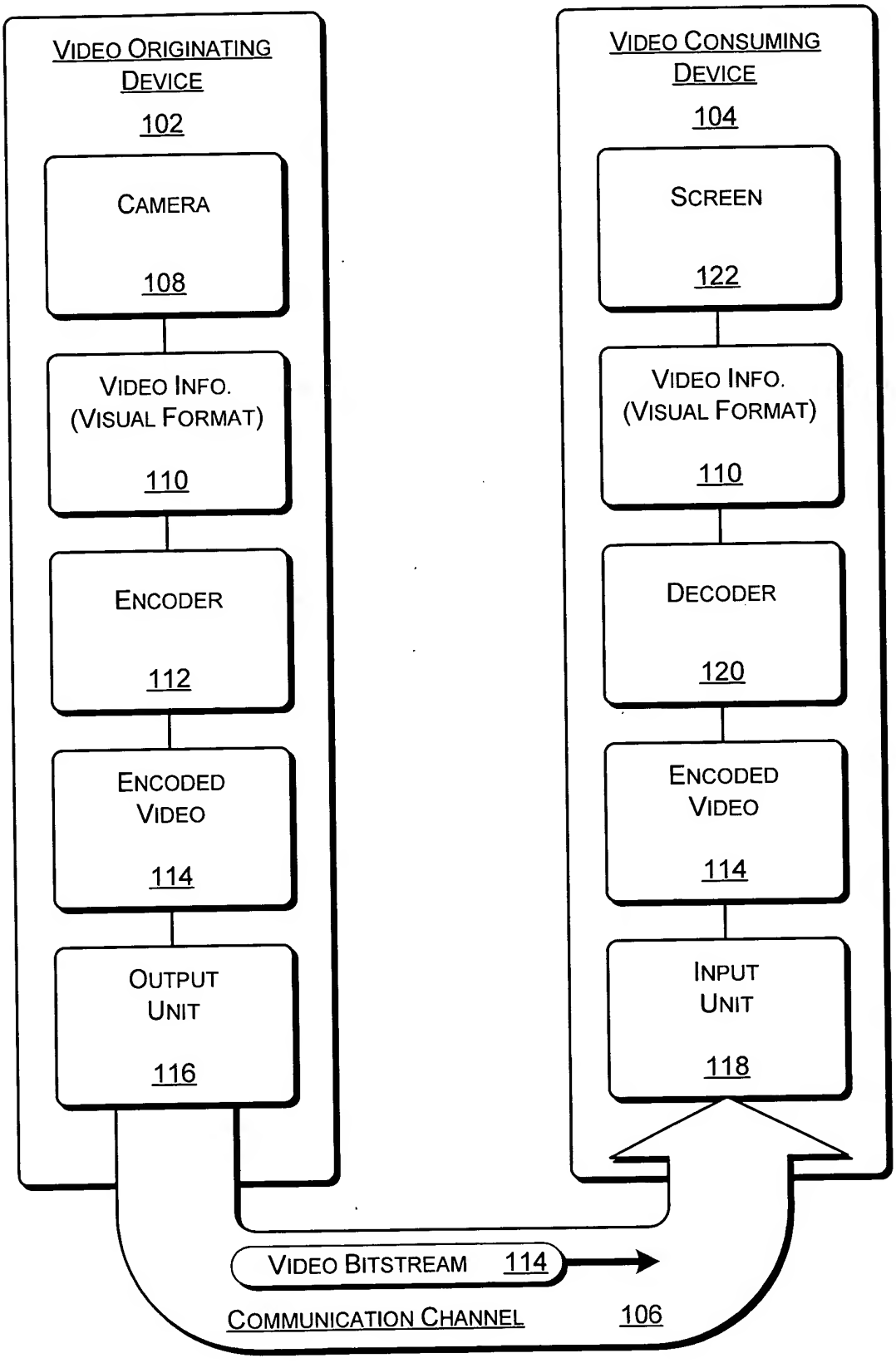
VIDEO ORIGINATING DEVICE
102
CAMERA
108
VIDEO INFO. (VISUAL FORMAT)
110
ENCODER
112
ENCODED VIDEO
114
OUTPUT UNIT
116
VIDEO CONSUMING DEVICE
104
SCREEN
122
VIDEO INFO. (VISUAL FORMAT)
110
DECODER
120
ENCODED VIDEO
114
INPUT UNIT
118
VIDEO BITSTREAM 114
COMMUNICATION CHANNEL 106
100

FIG. 1

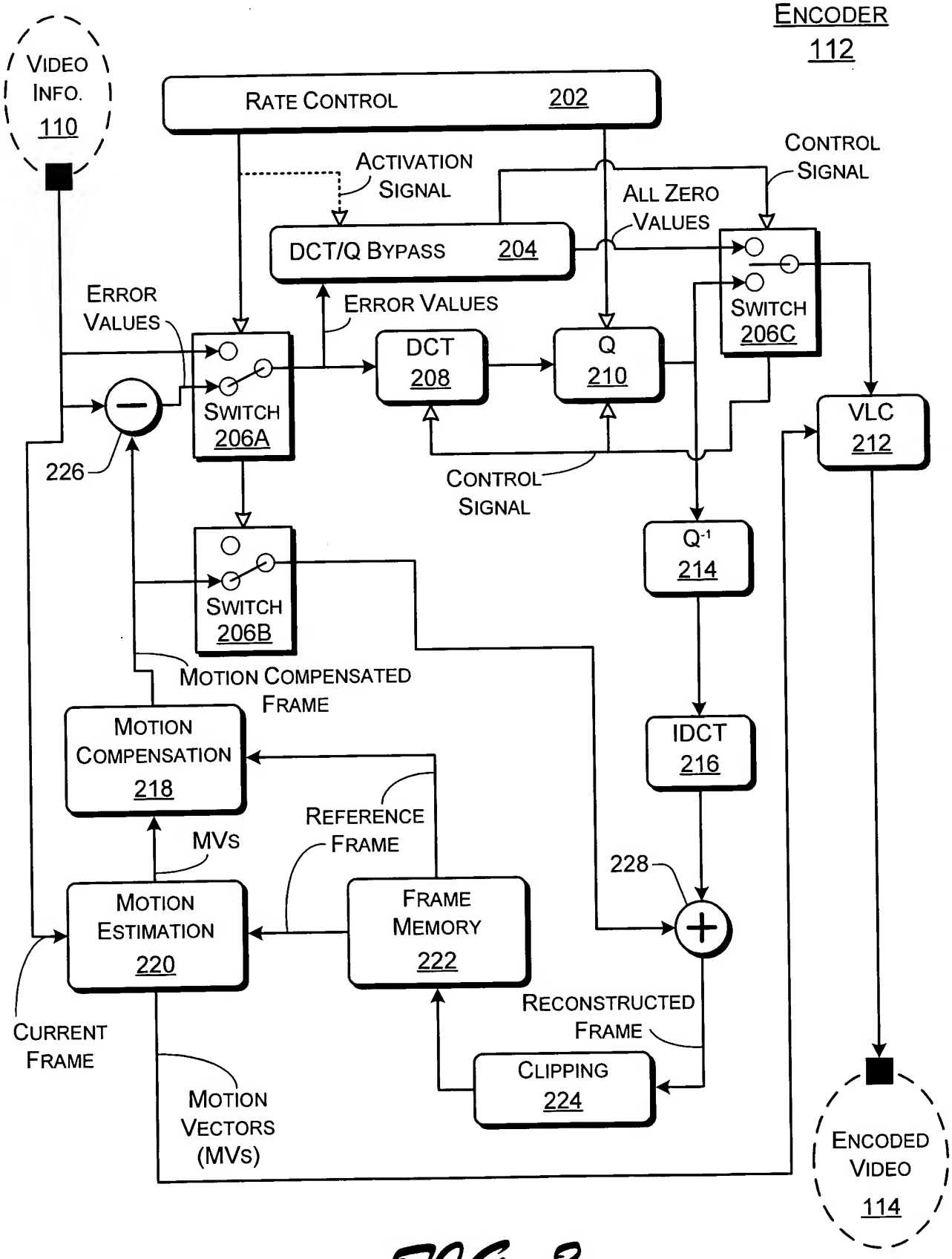
ENCODER
112
VIDEO INFO.
110
RATE CONTROL
202
ACTIVATION SIGNAL
CONTROL SIGNAL
ALL ZERO VALUES
DCT/Q BYPASS
204
SWITCH
206C
ERROR VALUES
ERROR VALUES
DCT
208
Q
210
VLC
212
SWITCH
206A
226
CONTROL SIGNAL
Q-1
214
SWITCH
206B
MOTION COMPENSATED FRAME
MOTION COMPENSATION
218
IDCT
216
REFERENCE FRAME
MVs
228
MOTION ESTIMATION
220
FRAME MEMORY
222
RECONSTRUCTED FRAME
CURRENT FRAME
CLIPPING
224
MOTION VECTORS (MVs)
ENCODED VIDEO
114

FIG. 2

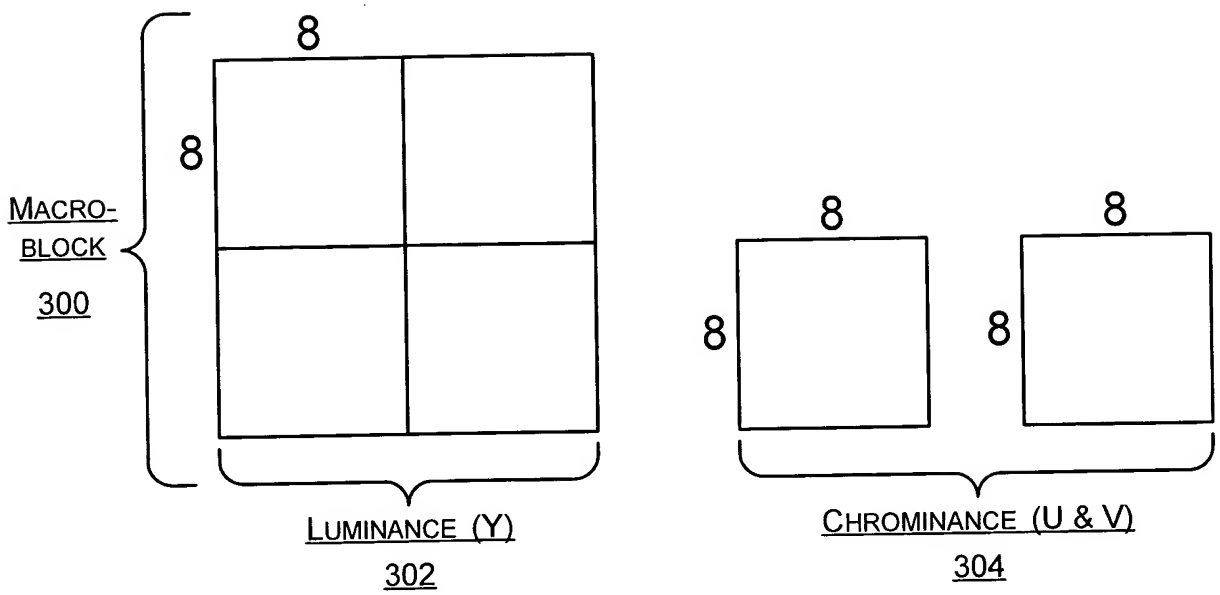

FIG. 3

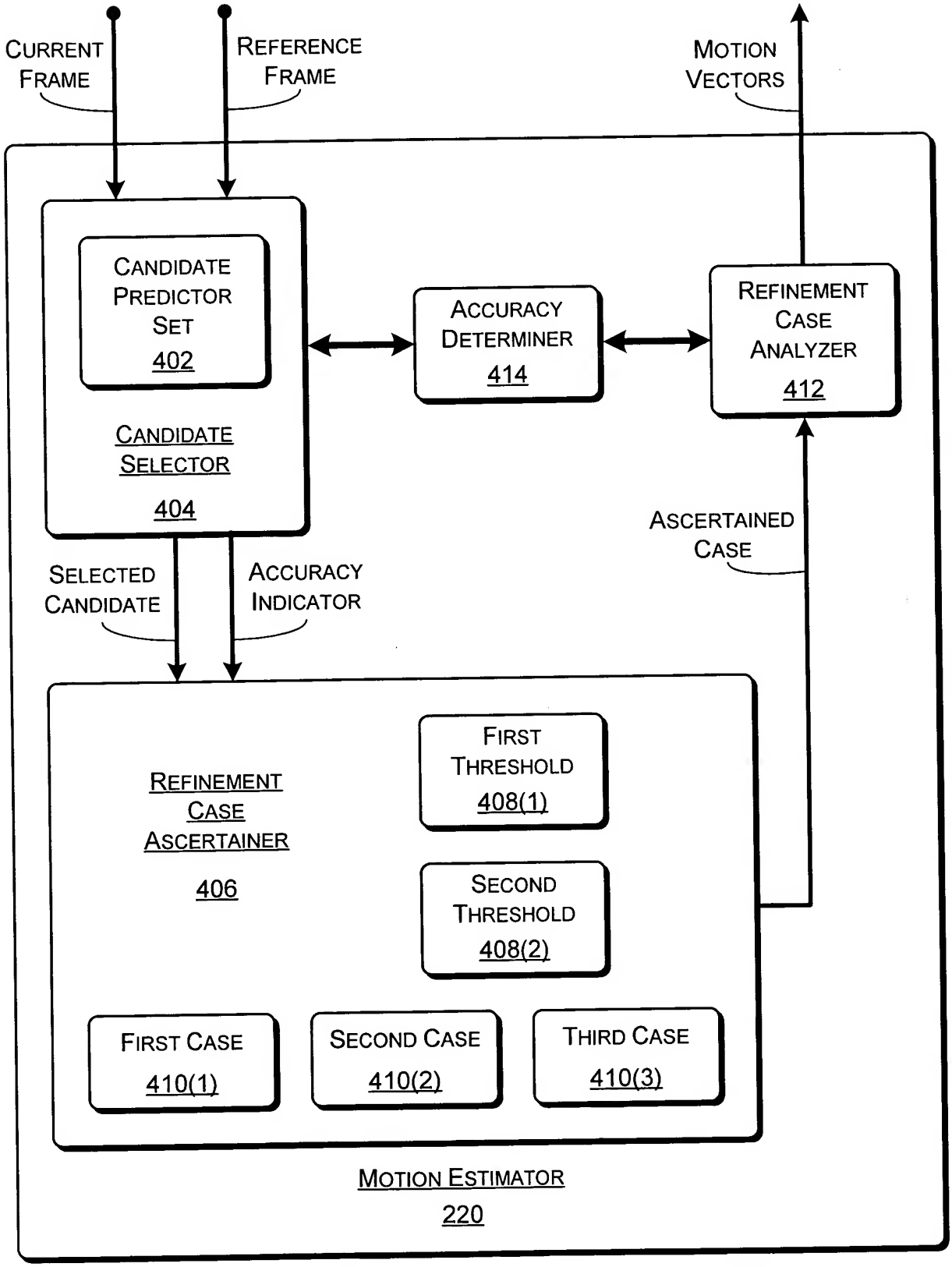
CURRENT FRAME
REFERENCE FRAME
MOTION VECTORS
CANDIDATE PREDICTOR SET
402
CANDIDATE SELECTOR
404
ACCURACY DETERMINER
414
REFINEMENT CASE ANALYZER
412
ASCERTAINED CASE
SELECTED CANDIDATE
ACCURACY INDICATOR
REFINEMENT CASE ASCERTAINER
406
FIRST THRESHOLD
408(1)
SECOND THRESHOLD
408(2)
FIRST CASE
410(1)
SECOND CASE
410(2)
THIRD CASE
410(3)
MOTION ESTIMATOR
220

FIG. 4

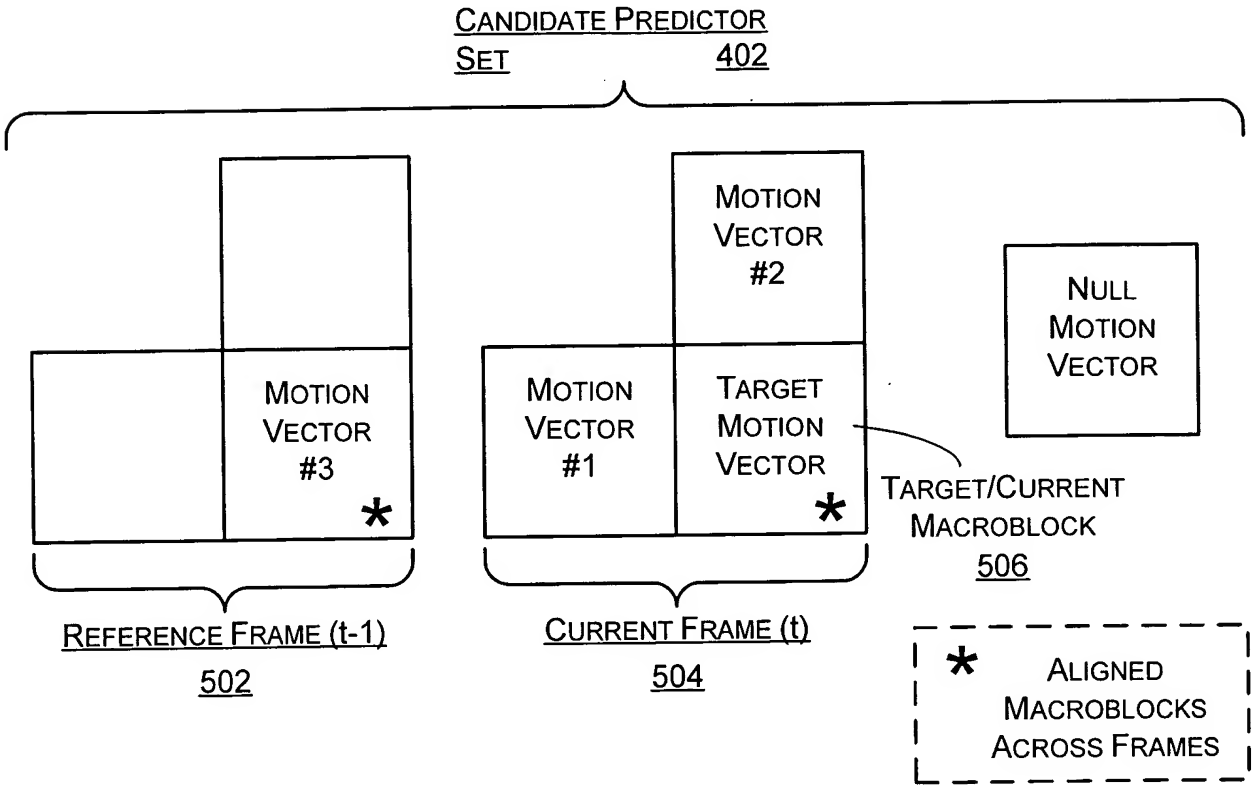
CANDIDATE PREDICTOR SET 402
MOTION VECTOR #3
MOTION VECTOR #2
MOTION VECTOR #1
TARGET MOTION VECTOR
NULL MOTION VECTOR
TARGET/CURRENT MACROBLOCK 506
REFERENCE FRAME (t-1) 502
CURRENT FRAME (t) 504
* ALIGNED MACROBLOCKS ACROSS FRAMES

FIG. 5

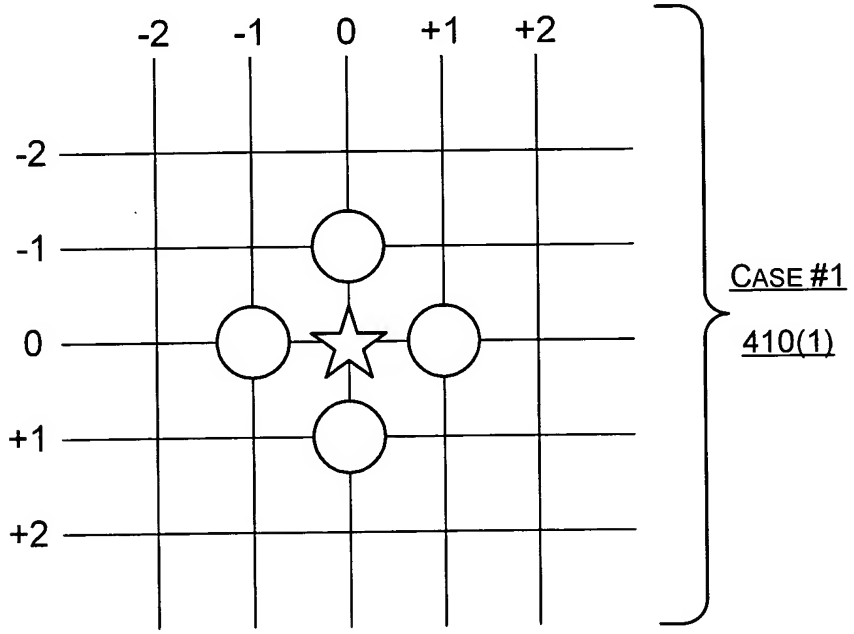
-2
-1
0
+1
+2
CASE #1 410(1)

FIG. 6A

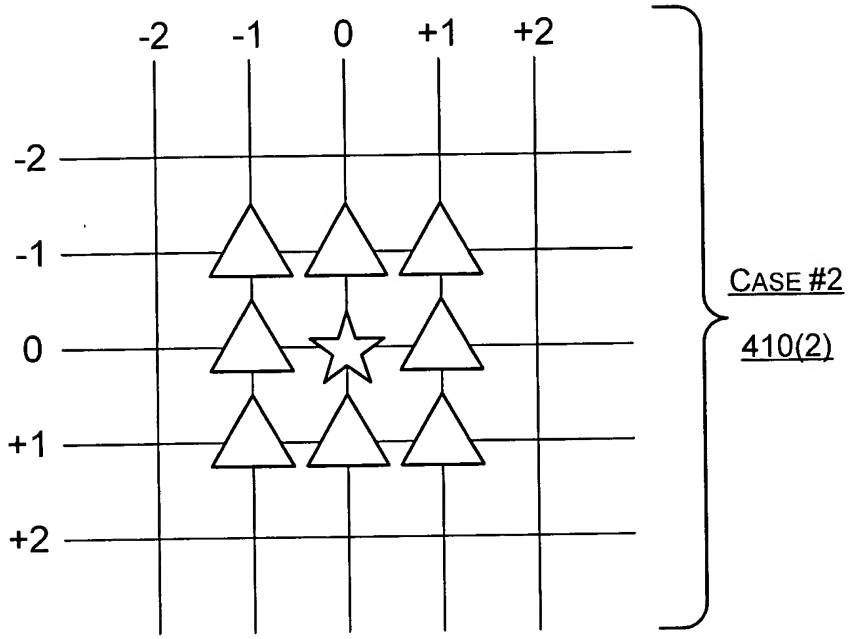

FIG. 6B

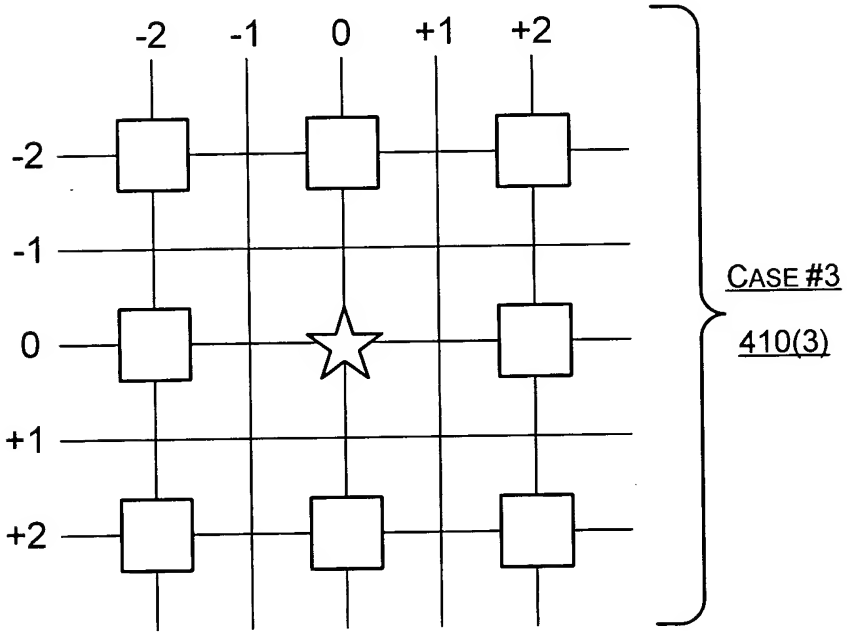

FIG. 6C

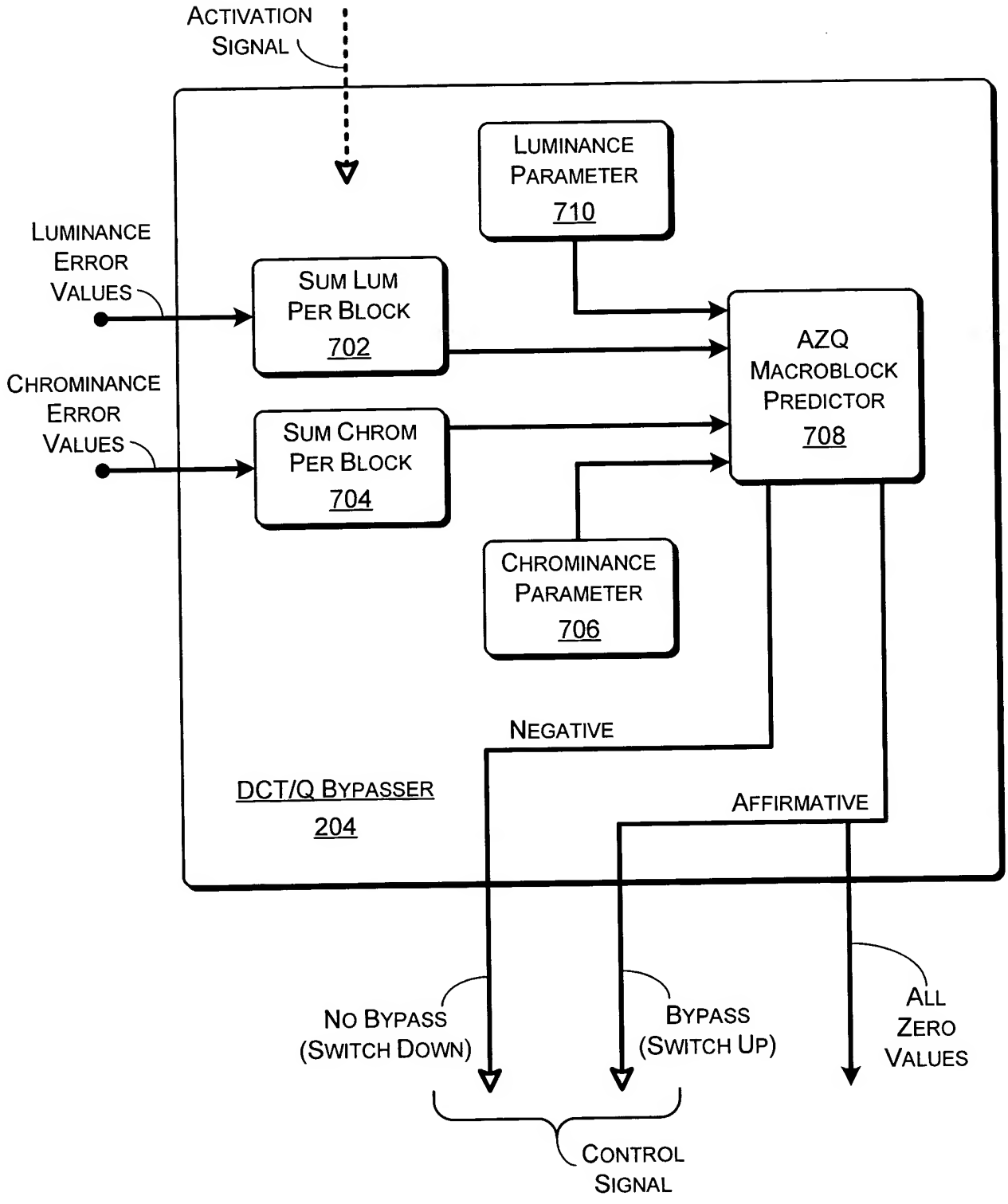
ACTIVATION SIGNAL
LUMINANCE PARAMETER 710
LUMINANCE ERROR VALUES
SUM LUM PER BLOCK 702
AZQ MACROBLOCK PREDICTOR 708
CHROMINANCE ERROR VALUES
SUM CHROM PER BLOCK 704
CHROMINANCE PARAMETER 706
NEGATIVE
DCT/Q BYPASSER 204
AFFIRMATIVE
NO BYPASS (SWITCH DOWN)
BYPASS (SWITCH UP)
ALL ZERO VALUES
CONTROL SIGNAL

FIG. 7

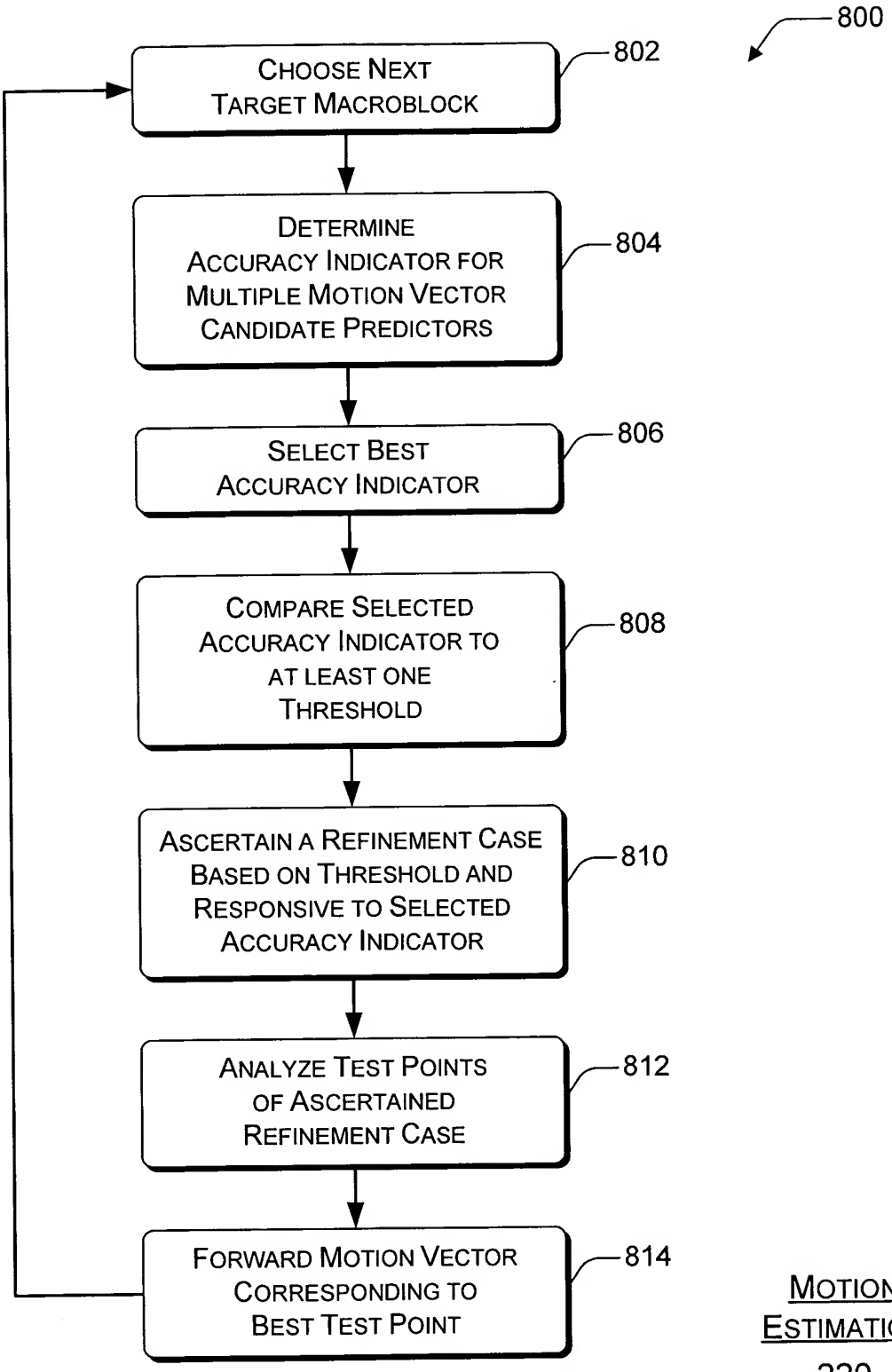
800
CHOOSE NEXT TARGET MACROBLOCK
802
DETERMINE ACCURACY INDICATOR FOR MULTIPLE MOTION VECTOR CANDIDATE PREDICTORS
804
SELECT BEST ACCURACY INDICATOR
806
COMPARE SELECTED ACCURACY INDICATOR TO AT LEAST ONE THRESHOLD
808
ASCERTAIN A REFINEMENT CASE BASED ON THRESHOLD AND RESPONSIVE TO SELECTED ACCURACY INDICATOR
810
ANALYZE TEST POINTS OF ASCERTAINED REFINEMENT CASE
812
FORWARD MOTION VECTOR CORRESPONDING TO BEST TEST POINT
814
MOTION ESTIMATION 220

FIG. 8

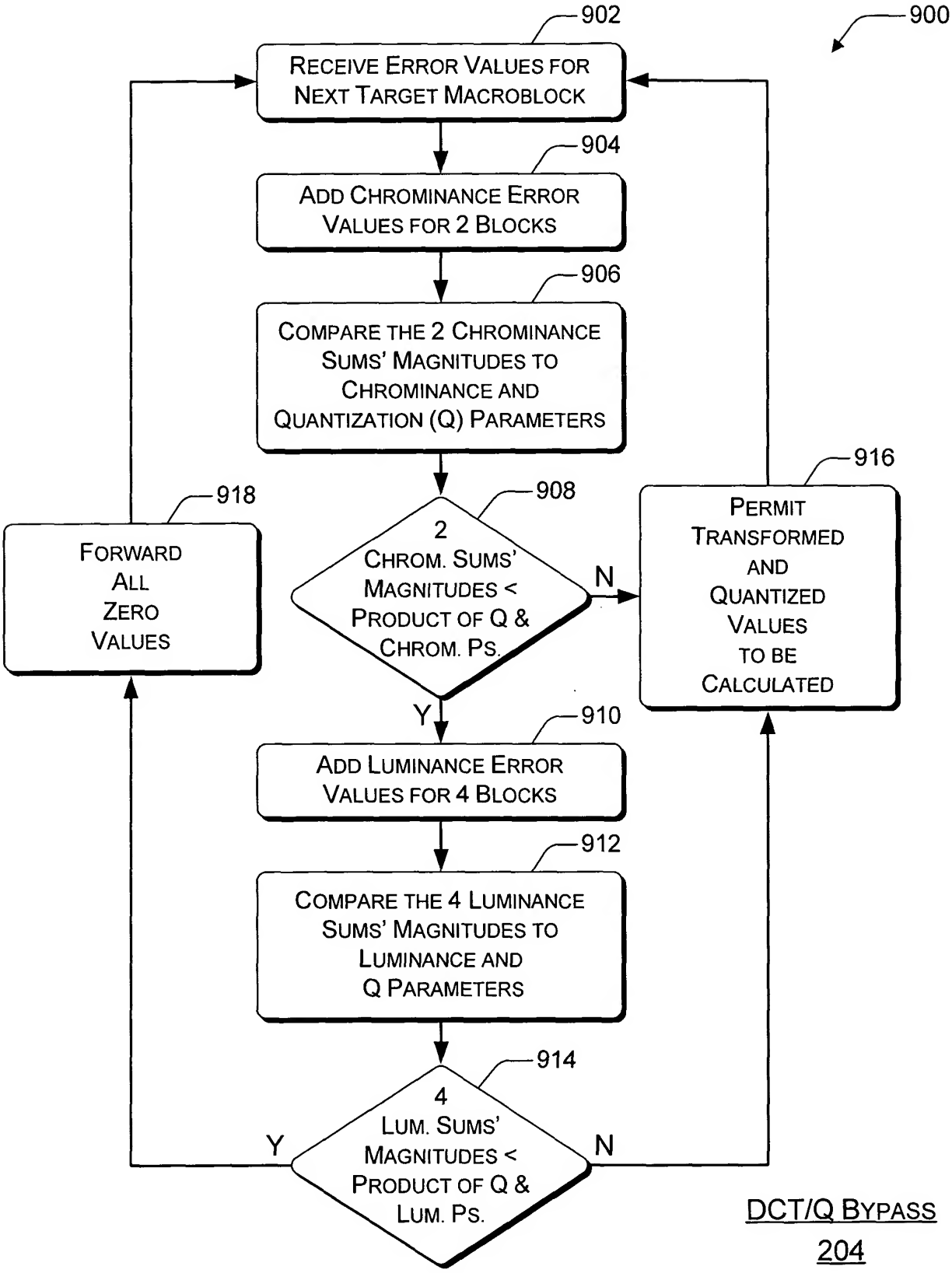
900
902
RECEIVE ERROR VALUES FOR NEXT TARGET MACROBLOCK
904
ADD CHROMINANCE ERROR VALUES FOR 2 BLOCKS
906
COMPARE THE 2 CHROMINANCE SUMS' MAGNITUDES TO CHROMINANCE AND QUANTIZATION (Q) PARAMETERS
908
2 CHROM. SUMS' MAGNITUDES < PRODUCT OF Q & CHROM. PS.
N
Y
910
ADD LUMINANCE ERROR VALUES FOR 4 BLOCKS
912
COMPARE THE 4 LUMINANCE SUMS' MAGNITUDES TO LUMINANCE AND Q PARAMETERS
914
4 LUM. SUMS' MAGNITUDES < PRODUCT OF Q & LUM. PS.
Y
N
916
PERMIT TRANSFORMED AND QUANTIZED VALUES TO BE CALCULATED
918
FORWARD ALL ZERO VALUES
DCT/Q BYPASS
204

FIG. 9

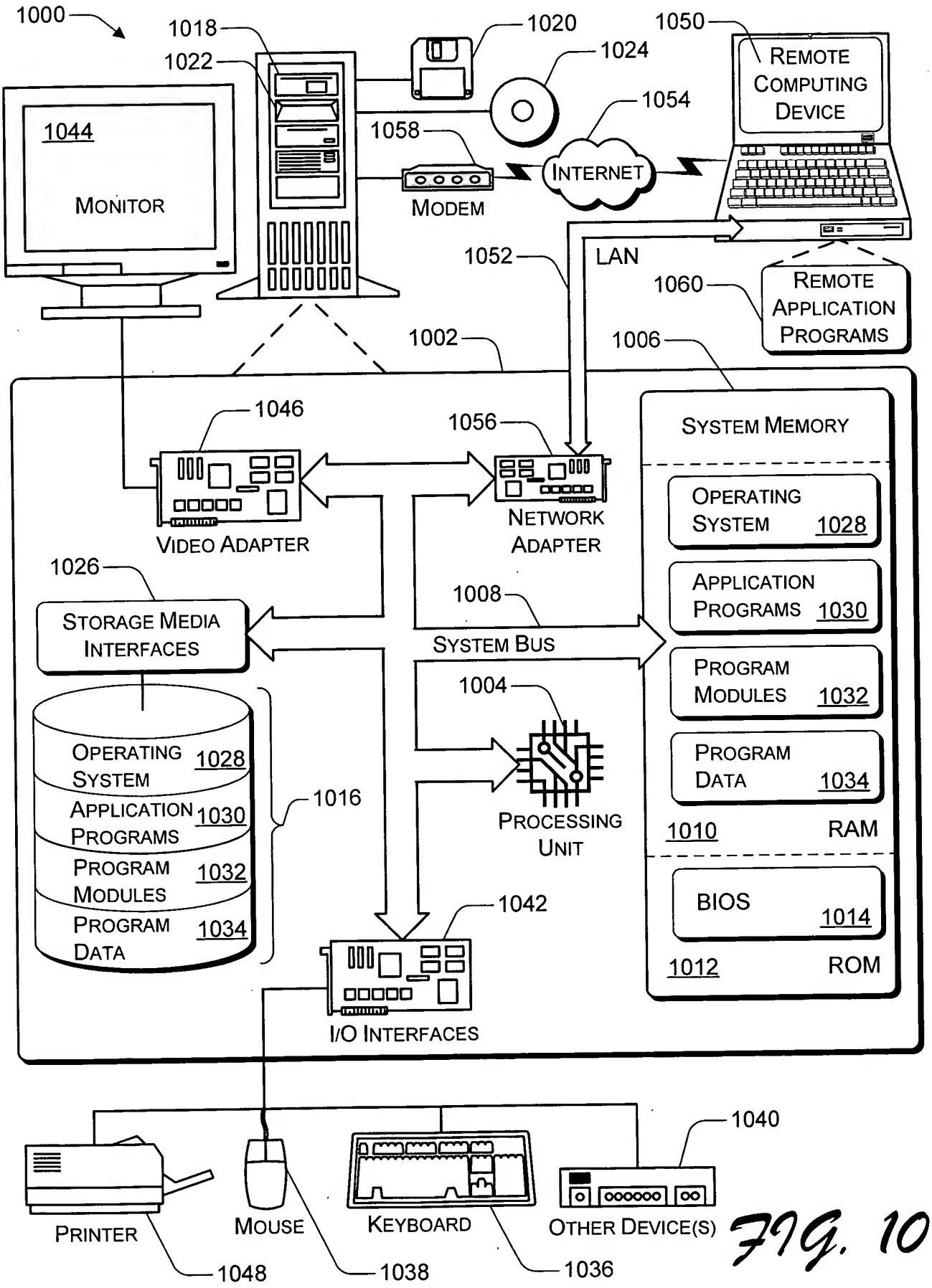
1000
1018
1022
1020
1024
1050
REMOTE COMPUTING DEVICE
1044
MONITOR
1058
MODEM
1054
INTERNET
1052
LAN
1060
REMOTE APPLICATION PROGRAMS
1002
1006
1046
1056
SYSTEM MEMORY
VIDEO ADAPTER
NETWORK ADAPTER
OPERATING SYSTEM 1028
APPLICATION PROGRAMS 1030
1026
STORAGE MEDIA INTERFACES
1008
SYSTEM BUS
PROGRAM MODULES 1032
1004
OPERATING SYSTEM 1028
APPLICATION PROGRAMS 1030
PROGRAM MODULES 1032
PROGRAM DATA 1034
1016
PROCESSING UNIT
PROGRAM DATA 1034
1010
RAM
1042
BIOS 1014
1012
ROM
I/O INTERFACES
1040
PRINTER
MOUSE
KEYBOARD
OTHER DEVICE(S)
1048
1038
1036

FIG. 10